Metal bonded
to canvas

PATENT SPECIFICATION

1,009,133

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COMPLETE SPECIFICATION
DRAWINGS ATTACHED

Improvements in or relating to the Manufacture of Footwear

WE, THE BRITISH BATA SHOE COMPANY, LIMITED, of East Tilbury, Essex, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

This invention relates to the manufacture of shoes and like articles of footwear, notably boots, slippers and sandals, hereinafter called shoes, wherein a sole composed of a plastic material is moulded by injection-moulding to a lasted upper applied to the mouth of the mould by which the sole is formed, the plastic material being injected in a hot molten condition into the mould, and wherein the upper is made of woven textile material, especially canvas.

In our work on the manufacture of canvas shoes in the manner described we have been confronted with the problem how to contrive that the hot plastic material will adhere with satisfactory bond strength to the canvas upper. It is thought that the hot plastic, immediately on coming into contact with the cool or comparatively cooler canvas, forms a skin which prevents the plastic from penetrating the interstices of the woven texture.

It has been found that satisfactory adherence can be achieved if the last on which the canvas upper has been lasted is directly heated to a suitable temperature before injection of the plastic material.

Therefore, the invention is a method of manufacturing shoes having woven textile uppers, by injection-moulding, which comprises the steps of positioning a lasted upper with respect to a mould, heating the sole portion of the last to a temperature above the temperature which such portion would reach by the natural transfer of heat during an injection moulding operation or a succession of said operations, and injecting plastic material in a hot molten condition into the mould to form a sole.

The invention also is an injection moulding apparatus for performing the aforesaid method including a last incorporating means for directly heating at least the sole portion thereof, a mould adapted to fit a lasted upper, and means for heating plastic material to be injected into the mould to form a sole in conjunction with said sole portion.

The invention also is a shoe of the type stated whenever made by the aforesaid method.

In performing the method according to the invention any thermoplastic material appropriate to the injection moulding may be used.

In an example, the last is formed with one or more long internal recesses extending along its bottom portion into which is or are inserted one or more electric heating elements adapted to heat at least the sole of the last to a suitable temperature, say about 100°C.

In the example, the shoe includes an upper-and-insole unit in the form of a sack, or sock, the insole being joined to the upper by stitching or otherwise.

In the example, the mould comprises a base and a pair of separate side members which are slidable upon the base to adjoin at the toe and heel ends thereof and which, when they adjoin, form with the base a cavity having the shape of the ultimate plastic sole. The side members are formed or provided with a peripheral lip defining the mould mouth which is closed by the lasted unit when applied to the lip. The arrangement is such that the upper-and-insole unit, lasted in any suitable manner, is applied to the lip of the mould and the

[Price 4s. 6d.]

bottom textile material of the unit is exposed in a hot condition within the mould cavity where in this condition said material is contacted by the injected hot molten plastic material. The one or more heating elements are effective to heat the last bottom so that the bottom textile material is at the desired temperature before the plastic is injected. Any suitable means is provided for heating the plastic material to be injected into the mould.

The foregoing example is illustrated by the diagrammatic drawing accompanying the provisional specification in which Fig. 1 is a side view, partly in section, of a lasted upper-and-insole unit applied to a mould, and Fig. 2 is a section on the line 2-2 of Fig. 1.

In the drawing, the last (which is of metal) is indicated by 10, the canvas upper by 11, the canvas insole by 12, the plastic outsole (and heel) by 13, the mould base by 14, the slidable side members by 15, each being fitted with a top plate 16 to define the lip of the mouth of the mould cavity, and the entry port for the injector nozzle by 17.

As shown, an electric heating element 20 is fitted into the lowermost portion of the last and extends from toe to heel. A small-bore passage 21 leading from the exterior is provided for the electric wiring.

WHAT WE CLAIM IS:—

1. A method of manufacturing shoes having woven textile uppers, by injection-moulding, comprising the steps of positioning a lasted upper with respect to a mould, heating the sole portion of the last to a temperature which such portion would reach by the natural transfer of heat during an injection moulding operation or a succession of said operations, and injecting plastic material in a hot molten condition into the mould to form a sole.

2. The method claimed in Claim 1 in which the temperature to which the last is heated is of the order of 100°C.

3. An injection moulding apparatus for performing the method claimed in either of the preceding claims including a last incorporating means for directly heating at least the sole portion thereof, a mould adapted to fit a lasted upper, and means for heating plastic material to be injected into the mould to form a sole in conjunction with said sole portion.

4. Apparatus as claimed in Claim 3 in which the last is formed with at least one internal recess extending along a major part of its botom portion, and an electric heating element inserted into said recess is adapted to heat at least the sole of the last.

5. Apparatus as claimed in Claim 4 in which the heating element extends substantially from toe to heel of the last.

6. Apparatus for manufacturing shoes having woven textile uppers, by injection-moulding, comprising a last incorporating means for directly heating at least the sole portion thereof, a mould consisting of a base and a pair of separate side members which are slidable upon the base to adjoin at the toe and heel ends of the last to form with the base a cavity having the shape of a plastic sole to be formed in the mould, and means for heating plastic material to be injected into the mould to form a sole on a lasted upper applied to the mouth of said mould.

7. Apparatus as claimed in Claim 6 in which the side members are formed or provided with a peripheral lip defining the mould mouth which is intended to be closed by the lasted upper when applied to said lip.

8. The method of manufacturing shoes having woven textile uppers, by injection-moulding, substantially as herein described and as illustrated by the drawings accompanying the provisional specification.

9. A shoe having a woven textile upper made by the method claimed in any of Claims 1, 2 or 8.

10. Apparatus for manufacturing shoes having woven textile uppers, by injection-moulding, substantially as herein described and as illustrated by the drawings accompanying the provisional specification.

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Fig.1.

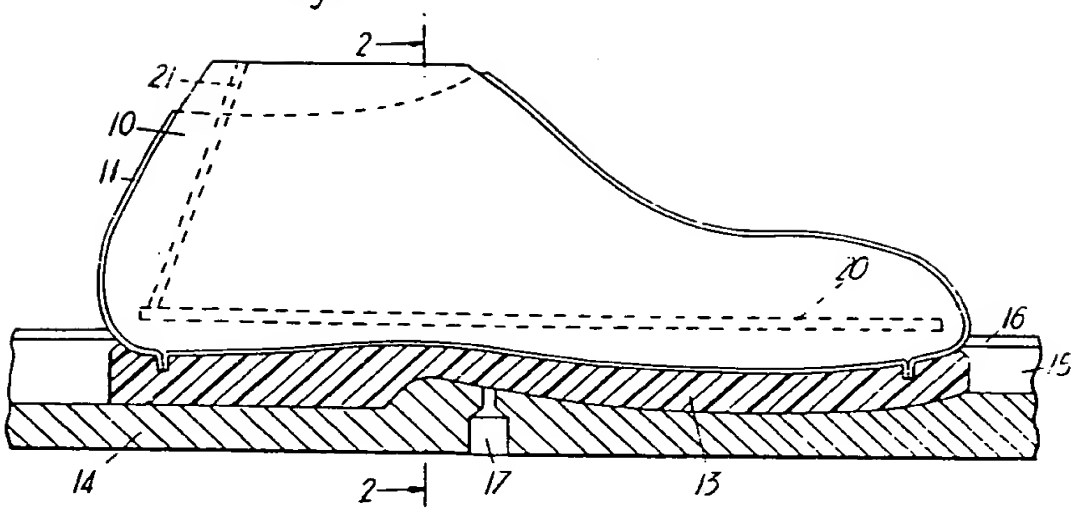

Fig.2